LITERATURE

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April 1922

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By Edwin E. Slosson

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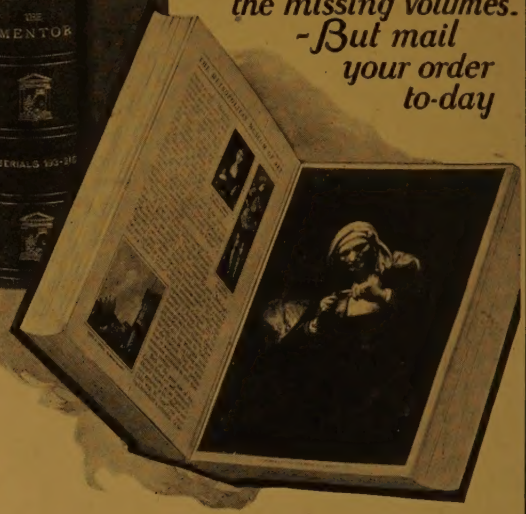

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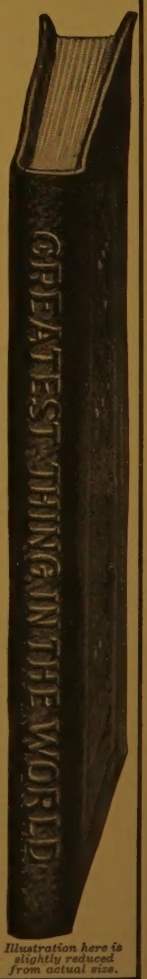

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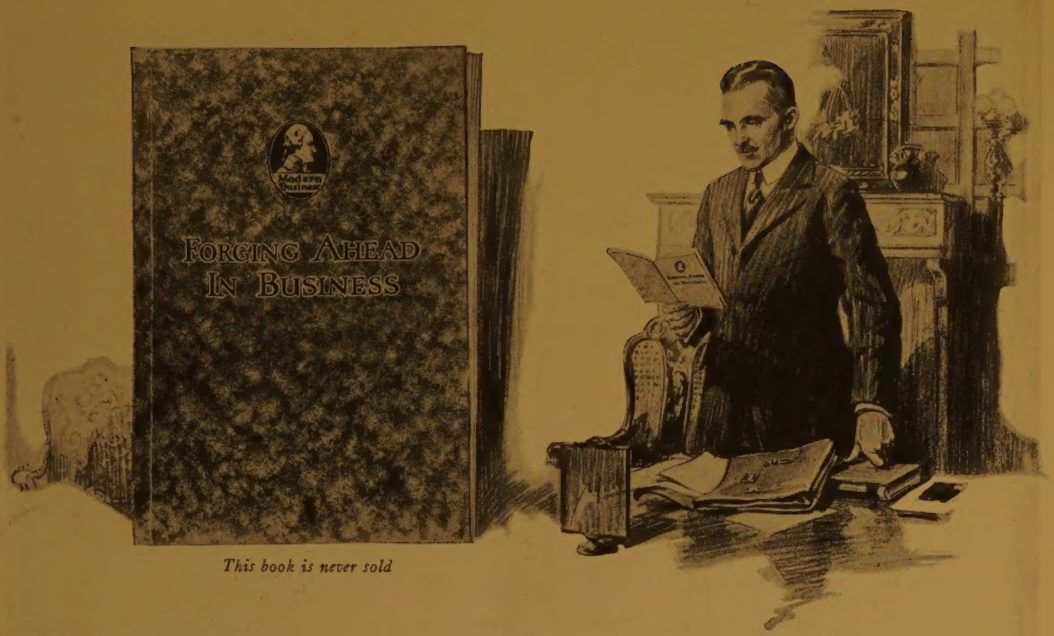

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HERE is a slim little volume of only 120 pages. It is not the work of a famous writer. It is not illustrated by a celebrated artist. It is not even bound in leather; its covers are of paper.

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THE MENTOR

VOL. 10 APRIL 1922 No. 3

CHEMISTRY IN EVERYDAY LIFE

By EDWIN E. SLOSSON, Ph. D.

Editor, "Science Service," Washington, Author of "Creative Chemistry," "The Spirit in Education," etc.

IT TOOK the Great War to rouse the public to the power and importance of chemistry. It was a war of chemists against chemists—in the making of nitrate explosives and diabolical poison gases. Now the chemists of all countries turn to the more congenial task of contributing to national health and prosperity.

Nitrogen, perverted by militarism to destruction, was meant by the chemist for creation. A ton of wheat takes away from the soil about forty-seven pounds of nitrogen, eighteen pounds of phosphoric acid, and twelve pounds of potassium. Therefore, if the farmer does not restore this much to his soil every year he is drawing upon his capital.

Before the war the European farmer was constantly feeding his capital through importations of nitrate fertilizer from the rich beds of western South America. The German yield in bushels of wheat per acre was nineteen in 1889-90. In 1913 it was thirty-five. In the United States the figures were twelve and fifteen. Germany imported 55,000 tons of Chilean saltpeter (sodium nitrate) in 1880 as against one hundred and thirteen bushels for the United States. But the United States uses only twenty-eight pounds of fertilizer per acre, while Europe uses two hundred. For three hundred years American farmers have been living on the unearned increment of the unoccupied land. This is more *mining* than agriculture. Now we must consider conserving our capital. Uncle Sam is exceptionally lucky in his inherited wealth, but he has not been idle in improving his property. From corn he has learned how to prepare a hundred useful products, from salad oil on our tables to the "rubber" tips on our pencils.

He has added ten dollars to the value of every bale of cotton by extracting oil from seed that used to be thrown away. He wastes nothing of the hog but the squeal, and he is now saving the smoke from his coke ovens. Out of this—the smoke, not the squeal—he gets ammonia and coal tar, and from tar in turn are produced the thousands of dyes and drugs and other chemicals that have become essentials of our civilization. Before the war, Germany had gained control of the coal-tar products, and all other countries paid

her tribute. But they have been forced into dependence during the war, and the German monopoly has been shaken. Before 1914, the United States used some $15,000,000 worth of coal-tar colors, and over $10,000,000 of these were *imported*. Now the tide has turned, and in 1920 the United States made enough dyes for her own use and *exported* $35,000,000.

WHAT COAL GIVES US

If you want to find out for yourself what coal contains, put a bit into a test tube and heat it. When the gas burns off, there will be, at the bottom of the tube, a piece of dry, porous coke. But in the middle of the tube, where it is neither too hot nor too cold, there will be water and some black sticky stuff. This tar was formerly considered a clogging nuisance and was thrown away. But chemistry has discovered that it is one of the most useful things in the world. It is one of the strategic factors in war and commerce. It wounds and heals. It is the basis of munitions and medicines. Into the black mass the chemist thrusts his hand and draws out all the colors of Joseph's coat.

Coal tar supplies all sorts of useful materials because it is the quintessence of the forests of untold millenniums. It is the scrap heap of the vegetable kingdom. It contains a little of almost everything that makes up trees. From the dozen primary products extracted from coal tar the chemist builds up hundreds of thousands of new substances, most of them not to be found in plants, and never even having had existence before being made up in the laboratory. Any kind of dye found in nature, whenever its composition is understood, can be made in the laboratory—and usually it can be made cheaper and

Chemist and Aviator Join Hands

To save this insect-ridden Ohio orchard, powdered arsenate of lead was released from the side of an airplane, and the wind did the rest. In less than a minute the bugs were all killed, and the fruit trees saved

To Safeguard Your Glass of Milk

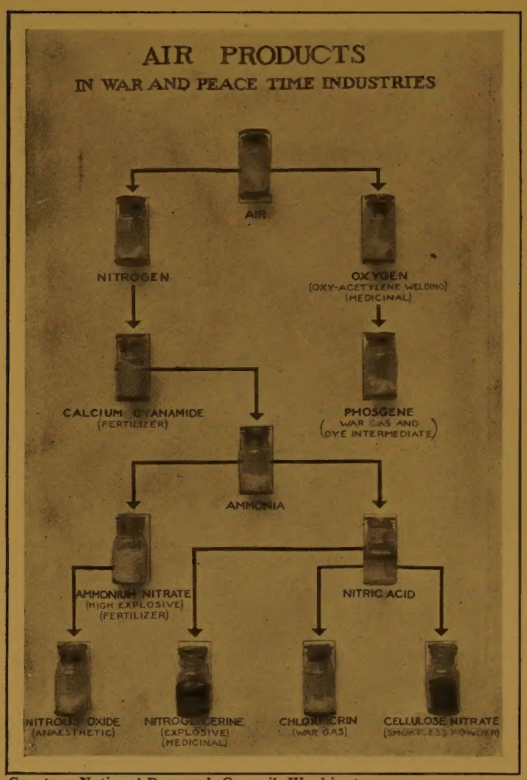
Chemists test samples of milk by laboratory methods to determine purity and percentage of butter fat. This is one way in which chemistry keeps down the death rate

purer than it can be extracted from the plant.

Before man found that he could make up all the dyes he wanted from the tar he had been burning up at home, he was searching the world over to find colors. For the Tyrian purple, which was formerly the insignia of royalty, he sought out a snail-like shellfish of the eastern coast of the Mediterranean, and from a tiny sack behind its head extracted a drop of thick whitish liquid smelling like garlic. For scarlet he robbed the lady cochineal bug of her coat. For indigo he went to India. A hundred years ago indigo cost as much as four dollars a pound. In 1914 we were paying fifteen cents a pound for it. Even the pauper labor of India could not compete with chemistry.

All the coal-tar products are so interrelated that the same factory and much the same processes may be employed in war and peace. In fact, in some cases, identically the same compound plays many parts. For instance, the yellow powder known as picric acid is a dye and an explosive. A soldier fighting under a yellow flag dyed with picric acid might have been wounded by a shell filled with picric acid and be taken to a hospital where his wound was disinfected with picric acid. The armistice left us with a large supply of poisonous chemicals on hand, which, fortunately, were no longer needed, and which we hope will not be needed in the future. Many of these have been transformed by simple processes into dyes and drugs and perfumes. The sudden popularity of certain shades in women's dress goods may not be due to a change of feminine taste, but rather to the abundance of material left over from the war which was made available for making these particular dyes. Phosgene, one of the most dreaded of the poison gases, is now being transformed into *violet perfume*.

It was in Philadelphia that the first chemical society was founded in 1792. And here Robert Hare invented the oxyhydrogen blowpipe and set up the first electric furnace. To-day the



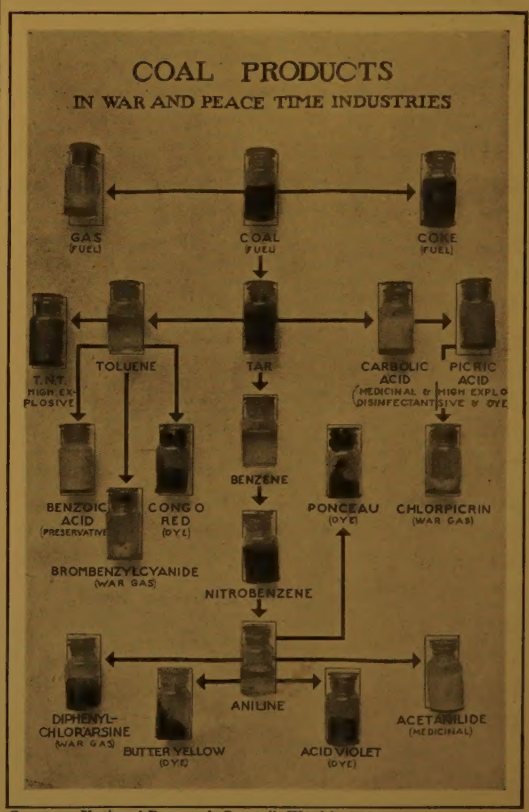
Courtesy National Research Council, Washington

Out of the Air

Come gases, dyes, medicines, fertilizers, explosives, anesthetics. When air is liquefied it separates into two main ingredients, oxygen and nitrogen. A wide variety of products is derived from them. Oxygen helps to weld metals, cure disease, color cloth. Nitrogen combines with other elements both to enrich the soil and disrupt it by violent explosion

American Chemical Society, with 15,500 members, is the largest special scientific society in the world, and Niagara Falls is the greatest center of electro-chemical industries in the world. Among these products is aluminum, which Hall, an Oberlin student, discovered how to extract by the electric current. The same electric agency separates common salt from the metal sodium and the gas chlorine, the former giving us lye for soap making, and the latter serving as a still more active detergent and disinfectant.

But electricity can unite as well as divide, and the power of Niagara Falls brings out of coal and sand a new substance, Acheson's carborundum, harder than anything except the diamond, and capable of cutting away the toughest steel. If the electric current is passed through a mixture of coal and lime, we get calcium carbide, which serves as the starting point for many useful products. Drop the carbide into water, and acetylene gas comes bubbling up. This, combining with oxygen from the air, gives a light bright enough to illuminate the path of the automobile or a heat sufficient to cut curves in a boiler plate as easily as the old-fashioned bracket-saw

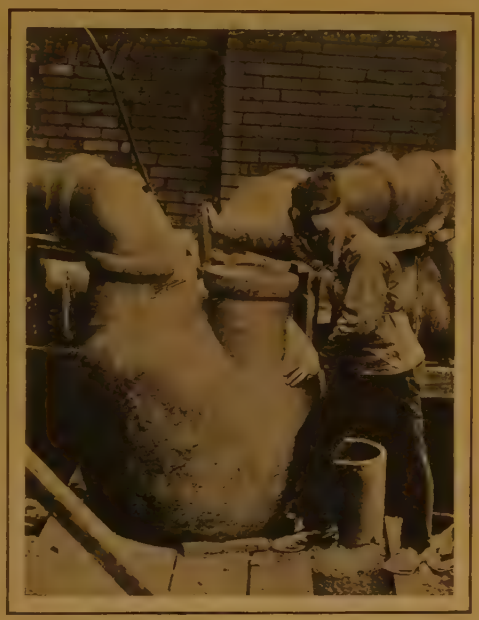


Courtesy National Research Council, Washington

Out of the Earth

Coal distilled yields coke, illuminating gas, and tar. Tar, in turn, is the parent of an amazing progeny, which includes disinfectants, the death-dealing T. N. T., preservatives, poison gases, perfumes, flavoring extracts, solvents, lubricants

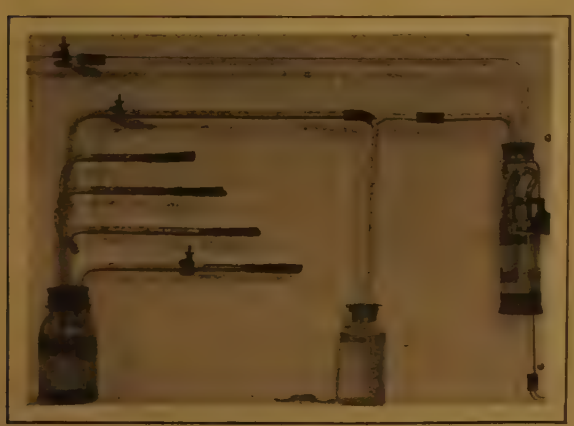
carved up hollywood. Pass air over hot carbide and it absorbs the nitrogen, and the compound treated with steam gives ammonia, which in turn can be made over into nitric acid—or a stream of artificial lightning passed through air will produce nitric acid directly. Nitric acid acting on cotton makes nitro-cellulose, used for smokeless powder. All the explosives, high and low, are made from nitric acid, so it was only because of the discovery of methods of getting the free nitrogen of the air into combination that enabled the Great War to be fought to a finish.



A Tiny Leak and Death Stalks Abroad
A gas-masked chemist inspects tanks containing phosgene as a precaution against the escape of the deadly gas

CELLULOID AND RUBBER

But nitro-cellulose has its peaceful pursuits as well as its war aims. A journeyman printer named Hyatt discovered, on combining it with camphor, that he got something new that he named "celluloid." This compound is capable of passing itself off as ivory or amber, or, undisguised, serving as the backing for photographic films. Designed for the purpose of imitation, it is in many ways better than the materials it imitates. Tortoise shell, for example, cracks, splits, and twists, but a "tortoise shell" comb of celluloid looks as well and lasts longer. Horn articles of real horn are naturally limited as to size, but an imitation of horn can be made of any thickness by wrapping celluloid sheets about a cone. Ivory may be imitated by rolling together alternate white opaque and colorless translucent sheets. Some of the sheets are wrinkled in order to produce the knots and irregularities of the grain of natural ivory. Red coral can be perfectly imitated by taking a cast of a coral branch and filling in the mold with celluloid of the same color and hardness. The clear luster of amber, the dead black of ebony, the cloudiness of onyx, the opalescence of alabaster, the glow of carnelian, are now within the reach of everyone, thanks to this chameleon material.



© Harris & Ewing
Testing Cigars for Nicotine by Chemical Analysis

To a Belgian chemist, Baekland, we owe "gaslight" photo-

graphic paper, also a synthetic plastic made from carbolic acid and formalin, named from its inventor "Bakelite." It is used largely as an insulator in electrical apparatus in place of hard rubber.

This reminds us that rubber dates back to that lucky accident of 1839, when Goodyear, a persistent Yankee genius, dropped a mixture of *caoutchouc* and sulphur on his kitchen stove and found when he picked it up that he had a tough and elastic material quite unlike the tacky gum and the yellow powder. To-day three quarters of all the rubber in the world is worked up in the United States — enough to "tire" the entire earth.

Better Bread for Less Money

Chemists have found a way to make better bread with only half the ordinary amount of yeast. Their discovery saves bakers millions of dollars a year

Scientifically, the problem of synthetic rubber has been solved; but not industrially. It can be made, but it cannot yet be made to pay. The difficulty is to find a cheap enough material to start with. We can make rubber out of potatoes—but potatoes have other uses. It would require more land, and more valuable land, to raise the potatoes than to raise the rubber. But eventually man will overcome that difficulty, and then, no matter how much synthetic rubber may be manufactured, there will be no danger of glutting the market, for as the price falls the uses of rubber will become more numerous. One can think of a thousand ways in which rubber could be used if it were only cheap enough. There is hardly any other material whose abundance would contribute more to our comfort and convenience.

© Keystone View

Beautifying Garments with Dyes

Invented and produced by chemical means for factory and household use

SUGAR, FOOD, AND FUEL

Once sugar came only from the cane. Then a chemist discovered that it was possible to extract sugar from the beet. At first there was only a little sugar in the beet root—some six per cent, and that was dirty and bitter. In 1810 Napoleon offered a prize of a million francs for a practical process of extraction. As a result the percentage of sugar from the beet rose from six to eighteen per cent and, by improved methods, became as pure and palatable as the sugar of the cane. As soon as the chemist made it possible to produce sugar at a reasonable price, all the nations began to buy it in proportion to their means. Americans, as the wealthiest people in the world, eat the most—ninety pounds a year on the average for every man, woman, and child. Pure white sugar is the first and greatest contribution of chemistry to the world's dietary.

Food in the body and fuel in the engine serve substantially the same purpose. They provide the energy for work. The carbohydrates—that is, the sugars, starches, and celluloses—can all be used as fuels, and also, even the cellulose, as foods. The final products, water and carbon dioxide, are in both

Chemistry Saves Your Shirts

A scientist attached to the staff of an institution for industrial research experiments with laundry processes to prolong the life of fabrics and reduce the cost of keeping clean

cases the same, and necessarily, therefore, the amount of energy produced is the same in the body as in the engine. Corn is a good sample of the equivalence of the two sources of energy. There are few better foods and no better fuel. In the old days, when corn was generally burned in the Western States, it was both an economy and a luxury, for, at ten cents a bushel, it was cheaper than coal or wood and preferable to either at any price. The long yellow ears, each wrapped in its own kindling, could be handled without crocking the fingers. Each kernel as it crackled sent out a blazing jet of oil, and the cobs left a fine bed of coals for the corn popper to be shaken over. Driftwood and the pyrotechnic fuel they now make by soaking sticks in strontium and copper salts cannot compare with the old-fashioned corn-fed fire in beauty and heat-giving. Last year, owing to the low price of corn, the Kansas farmers again took to using it in the place of coal.

BY-PRODUCTS OF COTTON

Old is the cry, "Cotton is King." But two thirds of the cotton crop, the seed, was wasted until the chemist found a practical use for it. He has added $150,000,000 a year to the value of the United States cotton crop by discovering ways of utilizing the cotton seed that used to be thrown away or used as fuel. The fuzz of cotton fiber sticking to the cotton seed can be removed by machinery and used for any purpose where length of fiber is not essential. For example, it can be nitrated and used for making smokeless powder or celluloid. The hulls of the cotton seed, amounting to seven hundred or nine hundred pounds in a ton, were formerly burned. Now they bring from four dollars to ten dollars a ton, and are ground up into cattle feed or paper stock or used as fertilizer. On being pressed, the kernel of the cotton seed yields a yellow oil and leaves a mealy cake. This last, mixed with the hulls, makes a good fodder for fattening cattle. Cotton-seed meal contains about forty per cent of protein, and is therefore a highly concentrated and very valuable feeding stuff. Even more valuable is the oil from the cotton seed. The seed contains about twenty per cent of oil, most of which can be squeezed out of the hot seeds by hydraulic pressure. The eventual refined product is a yellow oil, suitable for table use. Once it masqueraded as olive oil. Now it competes in the open, and America annually ships some 700,000 barrels of it to the Mediterranean.

IRON, THE AFFINITY SEEKER

Iron is one of the most timid of metals. It dislikes to be alone, prefers almost every

© Keystone View

The Delicate Flavor of Your Favorite Cake

May come out of a messy vat like this. The man in overalls is using a solution of lime and chalk to clarify and filter lemon juice

Chemistry Allays Suffering

And wards off disease. Disinfectants and anesthetics are a merciful contribution of chemistry to modern life

other element to itself, and has an especial affection for oxygen. As oxygen is in both air and water, iron is not long without a mate. The result of this union is, in common language, iron rust. One of man's greatest triumphs was the discovery of undoing iron rust and getting metal out of it.

The prosperity of modern states is dependent on the amount of iron rust which they possess and utilize. Nations are competing to see which can dig the most iron rust out of the ground and convert it into railways, bridges, buildings, machinery, and battleships, and then let them relapse into rust again. Civilization can be measured by the amount of iron rusted per capita, or, better, by the amount rescued from rust.

It is because iron is so rustable that it is so useful. The factories with big scrap heaps of rusting machinery are making the most money. The united elements, known to the chemist as iron oxide, and to the world in general as rust, are among the commonest of compounds, and their colors, yellow and red, are displayed on every mountainside. Man has been laboring ceaselessly to divorce these elements, and, having separated them, to keep them apart so that the iron may be retained in his service. Every year the blast furnaces of the world release 72,000,000 tons of iron from its oxides, and every year a large part reverts to its primeval forms. Thus after centuries of effort man has barely got a few years ahead of nature, and if he were to stop for a generation there would be little left to show that he had ever learned to extract iron from its ores. To save a pound of iron from corrosion is as much benefit to the world as to produce another pound from the ore. In fact, it is of much greater benefit, for it takes four pounds of coal to produce one pound of steel, so that whenever a piece of iron is allowed to oxidize it means that four times as much coal must be oxidized in order to replace it. And the coal beds of the world will be exhausted before the beds of iron ore. It is the eternal struggle of man against nature.

The value of iron lies in its versatility. It is a dozen metals in one. It can be made hard or soft, brittle or malleable, tough or weak, resistant or flexible, elastic or pliant, magnetic or non-magnetic, more or less conductive to electricity, by slight changes of composition and differences of treatment. The medieval mind ascribed these mysterious transformations to witchcraft. But modern science studies it in the light of its component minerals. With this knowledge at his disposal

© Keystone View

The Luster of the Glaze

Is a chemical secret closely guarded in every pottery that turns out works of art

the iron maker can work with his eyes open and so regulate his melt as to cause these various constituents to crystallize out as he wants them to. He is no longer confined to the alloys of iron and carbon. He has found new elements to add to his alloys, some of them possessing great practical value. Vanadium, for instance, was formerly confined to the attention of the advanced student of chemistry. To-day it is known to everyone who runs a motor car. Tungsten has become familiar through the tungsten lamps. The public is now learning to spell mo-lyb-denum. Upon the presence and proportions of such ingredients as vanadium, tungsten, chromium, titanium, nickel, cobalt, phosphorus, molybdenum, silicon, and sulphur depends the quality of steel, and a variation of a tenth of a per cent in certain of them will make a different metal out of it.

© Keystone View

We Would be Matchless

Without the aid of chemistry. In a modern factory millions of matchsticks are automatically dipped in three successive compositions mixed by experts

© Keystone View

Sugar from Corn

A latter-day gift of the chemist to the housewife. Corn sugar is 80% as sweet as the sugar product derived from the cane

When platinum was first discovered it was so cheap that ingots of it were gilded and sold as "gold bricks" to unwary purchasers. The "gold brick" scheme would now have to be reversed, for gold is used, as a cheaper metal, to "adulterate" platinum. Formerly, the Russian Government used platinum as we use nickel, for making small coins. But it is really a rare metal, found nowhere in quantity save in the Urals, and, since it seems indispensable in chemical and electrical appliances, the price has continually gone up. Just when the demand for platinum for war purposes was the heaviest Russia collapsed, and the other governments had to put a stop to its use for jewelry and photography. All the members of the platinum family, formerly ignored, were pressed into service—palladium, rhodium, osmium, iridium—and these, alloyed with gold or silver, were employed more or less satisfactorily by the dentist, chemist, and electrician as substitutes for the platinum of which they had been deprived. It is a pity that this family of noble metals is so restricted, for they are unsurpassed in tenacity and incorruptibility.

CHEMISTRY AS THE DEMOCRATIC SCIENCE

Chemistry is a most effectual agent for democracy, since it actually accomplishes in regard to many material things that equality which legislation aims to bring about in the political sphere. Luxuries, formerly the monopoly of the privileged

classes, become, through applied science, the common property of the masses. The "royal purple" of the ancients and dyes far more beautiful are now to be had on the bargain counter, and Solomon in all his glory was not arrayed like the modern American maiden. Even though her purse be scant, she need not lack jewels and bright raiment such as once were worth a slave's life. Fruits exotic and out of season are upon our dinner table, and the china we eat them from is not brought from China, but made from a clay bank at home. In early ages the man who owned a piece of steel shaped it into a sword and made himself master of his fellows. Now we make buildings out of steel, and he who lives in the garret of one of them could look down on the tower of Babel. The Feudal Age vanished at the first whiff of gunpowder, for that device of the black art leveled the natural and the artificial inequalities of humanity in warfare, for with a gun in his hand the churl could meet the knight on equal footing and the dwarf was match for the giant—more than a match, for the dwarf had the larger target.

© Keystone View

Painting the Metal Web of Brooklyn Bridge

The great structure would not last ten years if unprotected by paint, chemically produced

Medicines such as a prince could not have procured, though his physicians surveyed the earth from China to Peru, are now at hand to cure the pauper. The new chemical motive powers have given man in the automobile a very fair substitute for the seven-league boots of the fairy tale; they enable him to go down into the sea in ships on more or less lawful occasions, and they have endowed him with the wings that he has always longed for but never expected to get until he reached heaven. Books are no longer chained up in treasuries, but, manifolded by the magic of ink, are to be bought on the street corner like peanuts; pictures from the private gallery of prince or plutocrat are multiplied by the same mechanism and scattered throughout the land. We do not have to pay ten dollars to hear a song by Galli-Curci, since we can hear her at home. Caruso, though dead, yet speaketh. Events that few could witness are brought to all of us on the celluloid film. So, whether it be the satisfaction of our material wants or the gratification of our aspirations for art and literature, the chemist acts as the agent of applied democracy.

Nor has the chemist exhausted the possibilities of his science; there are greater marvels in sight. In the radio-active elements, such as radium, we have come upon sources of an energy that was never dreamed of by man. The most striking peculiarity of radium is that it is always a little warmer than its surroundings, no matter how warm these may be. It decomposes, and we know no way of hastening or of checking it. An ounce of radium salt will give out enough heat in one hour to melt an ounce of ice, and in the next hour will raise this water to the boiling point, and so on again and again for years, a fire without fuel. From the heavy white salt there is continually rising a faint fire-mist. This gas is known as niton, "the shining one." A pound of niton would give off energy at the rate of 23,000 horsepower; fine stuff to run a steamer, one would think—but it does not last. By the sixth day the power would have fallen off by half. Besides, no one would dare act as engineer, for the radiation will rot away the flesh of a living man who comes near it. It will not only break down the complex and delicate molecules of organic matter, but also will attack the atom itself, changing, it is believed, one element into another, the fulfillment of a dream of the alchemists!

The chemists have thus given us a glimpse of incalculable wealth in the meanest substance. For wealth is measured by the available energy of the world, and if a few ounces of anything would drive an engine or manufacture nitrogenous fertilizer from the air, most of our troubles would be over.

THE AWAKENING OF SPRING

ITS GREETING COMES TO CITY AND COUNTRY FOLK FROM THE SINGING BIRDS, THE FLOWERING PLANTS AND THE BUDDING TREES

Photographs by Mary C. Dickerson

HARBINGERS OF SPRING

Of all the harbingers of spring none is more beautiful or more appreciated than the soft and gentle pussy-willows. They come among the first blossoms after the winter's cold and snow. The downy woodpecker—in the oval—smallest of its tribe, has exercised her skill as a carpenter to make a snug home for her new family

Photograph from J. Horace McFarland

GOOD FOR CITY EYES

Crocuses, among the earliest and brightest of spring blooms, have been cultivated as far back as floral history goes. Winter is scarcely over when the rosy *Crocus Imperati* peeps from under the blanket of snow. In this picture snow may be seen down by the bushes at the sidewalk. Crocuses and snow drops are the first messengers of the budding season

CHERRY TREES BLOOM IN WASHINGTON

Brought from the Orient, these trees greet the return of spring at the nation's capital. Many forms of flowering cherries are cultivated in Japan, not for the fruit but for the blossoms, which are singularly beautiful. Some have white flowers, but most of the blossoms are a delicate pink

Photograph by G. Clyde Fisher

THE OPEN WOODS ROAD IN SPRING

"Afoot and light-hearted I take to the open road," sang the poet; and what could be more inviting than a winding wood road with enchanting curves to lure us on?

Photograph by Mary C. Dickerson

THE LURE OF THE SWAMP

Among the scattered trees is almost a pure stand of False Hellebore or Indian Poke, as it appears in late April. The plant is conspicuous, growing three or four feet tall, and having many large, plaited leaves. The flowers are related to the lilies and are tinted a yellowish green

Photograph by Dr. Frank Overton

PEEPERS USHER IN THE SPRING

When the ground gives up its moisture the Peeper is one of the first of earth's creatures to sing a song of spring. The throat is inflated and the mouth kept closed during the calling. The Peepers are small, about an inch in length, and they dwell during the courting season in low marshy ground. The chorus begins in February or March, and lasts into May. In the circle is a flashlight picture of a Peeper singing

Photograph by Mary C. Dickerson

A BIRCH IN SPRING ARRAY

The favorite situation of the Paper or Canoe Birch is on the banks of lakes and streams where it adds its delicate beauty to the spring landscape. To the Indians of New York and New England, this species of the Birch was the most important in the forest. Out of its bark they made their canoes and utensils, they covered their wigwams with it, and on it kept their records

Photograph by Mary C. Dickerson

BROOK IN SPRING

Along these vernal streams the frost first comes out of the ground, and here, if the woods are low and swampy, are found the earliest spring flowers. Frequently they bloom before all the snow has disappeared. The square picture enclosed shows the floating nest of the diving grebe, a bird that makes its home among the rushes. When the young birds are hatched they can swim with their parents, or perhaps ride on their mother's back

Photograph by A. A. Allen, Ph. D.

"SECOND CALL FOR DINNER"

A Louisiana water thrush is feeding its young. The principal diet of these baby warblers is caterpillars and other soft-bodied insects

Photograph by Robert W. Rockwell

A SNUG HOME FOR A SPRINGTIME FAMILY

The picture shows a thrifty Mountain Bluebird that has taken possession of a cavity made by a Flicker between the inner and outer walls of a framed building

BABY OWLS TAKE L

A DAY AT HOME WI

Photograph by Mary C. Dickerson

CHICKADEE NESTLINGS

The Chickadee is a permanent resident in the North; its nesting site is usually a cavity in a tree. Here are six taking the air

VERY SERIOUSLY

Photograph by G. Clyde Fisher

A CITY SUBSTITUTE FOR THE BOUGH OF A TREE

A step on a precarious fire escape is home to these baby robins. The robin likes to nest near human habitations. He believes in being "a friend to man"

TH THE BABY BIRDS

Photograph from J. Horace McFarland

A SPRING BOTANIST

The Bloodroot with its pure white flowers attracts a small boy's eyes, but the fact that the petals fall off at the slightest touch will cause him to discard very soon any that he plucks. This is a flower that must be loved and left on its stalk. The flower gets its name from the blood-red sap of the plant, and especially of the fleshy root-stock. It comes into bloom at the base of trees early in the spring, while the woods are still bare

Photograph by Elsie M. Kittredge

FLOWERING DOGWOOD IN FULL BLOOM

When the Flowering Dogwood is in bloom, it is time to plant corn, according to an Indian legend. Later in the season, it is equally attractive in fruit, the flowers being followed by bunches of bright red drupes, which hang on the tree until after the leaves turn bright red and fall off

Photograph from J. Horace McFarland

A FRAGRANT BANK IN SPRING

The Narcissus, a native of the Old World, was brought to America in the early days of the country's history. One species, the Common Daffodil, in both the single and double-flowered forms, became the "Easter Flowers" of our grandmothers' gardens

Photograph by A. A. Allen, Ph. D.

"WOOL GATHERING"

The Yellow Warbler always uses a large proportion of plant-fiber in the structure and lining of her nest. The plant-down is usually light in color, and, as shown in this picture, the female is not averse to accepting the help of human friends. She will take any nest-building material that man is willing to give her

Photograph by Robert W. Rockwell

SPRING OPENING FOR MRS. SQUIRREL

A Colorado ground squirrel emerging from winter quarters. Her home is under the shelter of a friendly log

Photograph by R. H. Beebe, Courtesy *Country Life*

WHAT IS THE WORLD LIKE?

Baby Woodchucks have come from a burrow beneath the roots of a tree to explore their surroundings

Photograph by G. Clyde Fisher

YOUNG PORCUPINE ON A SPRING JAUNT

A little girl is attempting a friendship. Perhaps it is just as well that he is unsocial, for a too near approach would cause a quick flirt of the tail, and a loosening of sharp quills. Contrary to popular superstition, the quills are never thrown out, but penetrate only on contact. At the approach of spring, the porcupine welcomes the starting of the sap under the bark, and the swelling of the buds of the trees that furnish him food

Photograph by A. B. Howell, Courtesy *Country Life*

NOT OLD ENOUGH TO BE AFRAID

A young Marten, in Wyoming, on a voyage of discovery. Curious and friendly, he has not yet developed the native caution of his kind. He was "snapped" by the camera before he could make up his mind whether there was distinction, disgrace, or discomfort in being photographed

Photograph by Elsie M. Kittredge

THE "INITIAL TREE"

"In the spring the young man's fancy lightly turns to thoughts of love"

Spring marks the beginning of many a romance, and how many have been recorded on the Beech Tree! Its smooth bark lends itself to carving better than any other tree of large size that we have. And who could convince the swain who wields the jack-knife that this is vandalism?

WHAT HAPPENED TO THE DODO

"AS DEAD as the dodo," is a favorite figure of speech in English. It occurs in the newspapers every few days. It expresses utter extinction. Yet few persons know what manner of bird the dodo was, where it lived, and what drove it from the face of the earth two hundred years ago.

About the year 1510, a party of Portuguese navigators, under one Cornelius Van Neck, landed for water and provisions on the Island of Mauritius, one of a small group in the Indian Ocean, off the African coast. They returned with stories of remarkable birds they had found. A number of these birds were killed and cooked, but the meat, except for the breast, was found to be tough and ill-flavored. So the sailors named the ungainly creature, which they could easily overtake and kill with clubs, *walckvogel*, disgusting bird. This *walckvogel* was the dodo; and the sailors, the first Europeans to have seen it.

From a contemporaneous drawing

The Dodo—Almost a Legend To-day

This queer bird once was plentiful on the Island of Mauritius, but is now existent only as a specimen in museums of natural history and in a common figure of speech indicating complete extinction

Both Portuguese and Dutch saw the dodo frequently after this, in Mauritius and the neighboring Island of Bourbon. Between 1610 and 1620 several live specimens were brought into Europe. There were apparently two species, the Mauritius and the Bourbon dodo. The former was ashy gray, with a bluish cast, lighter on the throat and upper breast. The short, stubby, undeveloped wings, useless for flight, bore a few yellow feathers, as did the tail. An enormous beak, useful for tearing at vegetation, was the bird's most conspicuous feature. The Bourbon variety differed only in coloration; its plumage was a beautiful white, its wings, bill, and feet a brilliant yellow.

Altogether the dodo was a ridiculous figure. It was slow of movement and perception. Its feeble, petulant cry, out of all proportion to so huge a bird, its waddling gait and stupidity, made it the butt of humorists.

The last authentic record of the dodo shows that it survived until the year 1681. Since then no man has seen the unfortunate bird. The causes of its extinction are not hard to find. It was not a prolific breeder, laying but one egg in an unprotected tuft of grass. Before the coming of the Portuguese, it was apparently able to maintain itself, but so many were killed and salted down for food by the sailors that touched on the islands in the sixteenth and seventeenth centuries that its numbers rapidly diminished. The chief cause, though, was the introduction of pigs into the islands. The pigs reverted to wildness and speedily overran the islands, devouring the dodo's eggs and even the young birds.

Science owes what it knows of the dodo to the records of early navigators, contemporary drawings, and various fragments of the birds preserved at Vienna, Utrecht, and Berlin. The British Museum has a foot; the Ashmolean Museum at Oxford a head and a foot; the University of Copenhagen a complete skull. In 1865, and again in 1889, many bones of dodoes were discovered in a marsh at Mauritius. From these a complete skeleton has been set up in the British Museum.

There has been much discussion as to how the dodo came by its curious name, but naturalists generally agree that it is a corruption of the Portuguese word *doudo*, a simpleton. An early English traveler corroborates this in an account of his trip to Mauritius.

The dodo is interesting not merely as a curiosity. It offers to biologists an enlightening study in the nature and causes of extinction. Had the dodo survived, it might have been domesticated, and formed, perhaps, an important source of to-day's food supply.—*Leon Augustus Hausman, Ph. D.*

PEOPLE THAT EAT ONLY MEAT

VEGETARIANS would find little to approve of in the country of the Masai in British East Africa, for the natives there eat only meat, and hold everything that is grown out of the earth as despicable food, fit only for monkeys, not for men.

A stout ox is their harvest field, a stout ox is their reservoir: when hungry they eat him, and when thirsty they go to him as we would to a faucet, and by shooting an arrow into the large vein of his neck draw off sufficient blood for their requirements. Sometimes they drink the blood undiluted, sometimes mixed with milk. After the operation the animal is sent back to the herd to graze at peace until such time as his condition permits him being tapped again, or until he is driven to some cool place in the forest, near running water, to be killed and devoured.

Two Masai Huntsmen

With a leopard that has fallen to the white man's gun. They are no longer permitted to raid other villages, so they have turned to hunting by way of substitute for their former chief sport

The Masai are truly an extraordinary tribe, and certainly more interesting and more romantic than any other to be found in Africa. There are hardly fifty thousand of them all told, yet they are the people that for generations held undisputed sway over the millions that inhabit the vast land now known as the Kenya colony, which is situated between Lake Victoria Nyanza and the coast. Their fighting men, traveling for the most part at night, would cover incredible distances, falling with ruthless fury upon some unsuspecting village situated perhaps three or four hundred miles away.

During a stay in Africa, I was fortunate enough to be on intimate terms with a number of Masai fighting men. It was their practice, they told me, to attack at dawn, swooping down from a hidden retreat where they had rested from their long march. They would set fire to the huts, and then, as the panic-stricken victims came screaming out of the flames into the chill air of early morning, they would fall upon them with spear and club. The men they would kill, but the girls they would take with them, driving them along with the cattle.

"And what of the children?" I remember once asking as we sat over a camp fire by the shores of Lake Elementeita.

"Ah," said the old warrior who was just then speaking, "we put our spears into most of them, for," and he turned his fierce countenance in my direction, "you must know that every man child born into the world is an enemy of the Masai."

This system of wholesale robbery won for them the vast herds they still possess. Man for man they are probably the richest people in the world. If their stock were pooled, each Masai would be worth several thousand dollars. This great wealth makes them and their affairs a real problem to the English Government. Hut taxes leave them untouched, and it is rarely that they seek employment outside their own reserve. If treated with courtesy they can sometimes be persuaded to work as herders, but, although they far surpass any other native in this capacity, they are so arrogant and touchy that few settlers will be bothered with them. They are very hot-tempered, and quick as lightning with their spears. "Never hit one of those fellows unless you knock him insensible, or you will have six inches of steel in you," was the advice of a pioneer to me, upon catching sight of a Masai on his farm.

It is, however, a curious fact that the Masai alone of the tribes in this part of Africa have never risen against the white man. It was explained to me that just before the coming of the English an old chief prophesied on his deathbed that a huge serpent would appear in the land bearing on its back a strange people against whom the Masai should on no account wage war. The appearance of the Uganda railroad was taken by the Masai as a fulfillment of this prophecy.

The construction of Masai society is frankly militaristic. From birth to the age of eighteen the boys, or "laioni," as they are called, herd cattle. At eighteen they become fighting men, or "morani." They go about in

"Morani," Masai Warriors, Resting at the End of a Profitable Hunt

troops differentiated by certain signs painted on their buffalo-hide shields. Each morani is given a number of girls as companions, though until they are past the fighting age they are not permitted to marry or have children, lest their domestic preoccupations should interfere with their zeal as warriors. At thirty they become old men, and are allowed to buy wives and settle down. They then spend the rest of their lives eating beef, drinking blood, watching their herds increase, and speaking words of wisdom over the camp fires.

Now that raiding is no longer possible, the morani have turned to lion hunting to satisfy their heroic instincts. True, they hunt leopards, buck, and other game, but the lion only they regard as worthy of their mettle. Scarce one of them but what has been scarred by tooth or claw in these contests. It is naked man against naked beast. Some twenty morani will surround a lion and advance slowly upon his lair. It is taken for granted that one of them must fall to the first charge, but as soon as the victim is down the others rush in and man-handle the enraged beast to death, some clinging to his swinging tail, some grabbing at his ears and legs, while others stab the life out of him with their spears. The tawny skin of their quarry they use as a dress for ceremonial occasions.

There is one subject of inexhaustible interest to laioni, morani, and old men alike—cattle. They think and dream of nothing else. There are more words referring to cows in the Masai tongue than in the vocabulary of any other language. When a Masai dies, if he is important enough, he is wrapped for his last long sleep in the hide of a favorite ox.

Llewlyn Powys.

AN UNHONORED AMERICAN INVENTOR

ON MARCH 9, 1922,—the sixtieth anniversary of the historic battle between the "Monitor" and the "Merrimac"—a commemorative tablet was unveiled on the site of the DeLamater Iron Works in New York City. This tablet honors John Ericsson, the engineer that designed the historic ironclad, and Cornelius DeLamater, in whose shops the "Monitor's" machinery was constructed. Ericsson and DeLamater did their parts in creating that epoch-making warcraft, as is generally known; but there is another name that would well have been on the tablet: that of Theodore R. Timby, inventor of the revolving gun turret. Timby failed in life to win recognition from the Government, and it is not surprising that his name is comparatively unknown to Americans of the present day and age.

Theodore Timby
He invented the armored revolving gun turret, for which Ericsson got the credit

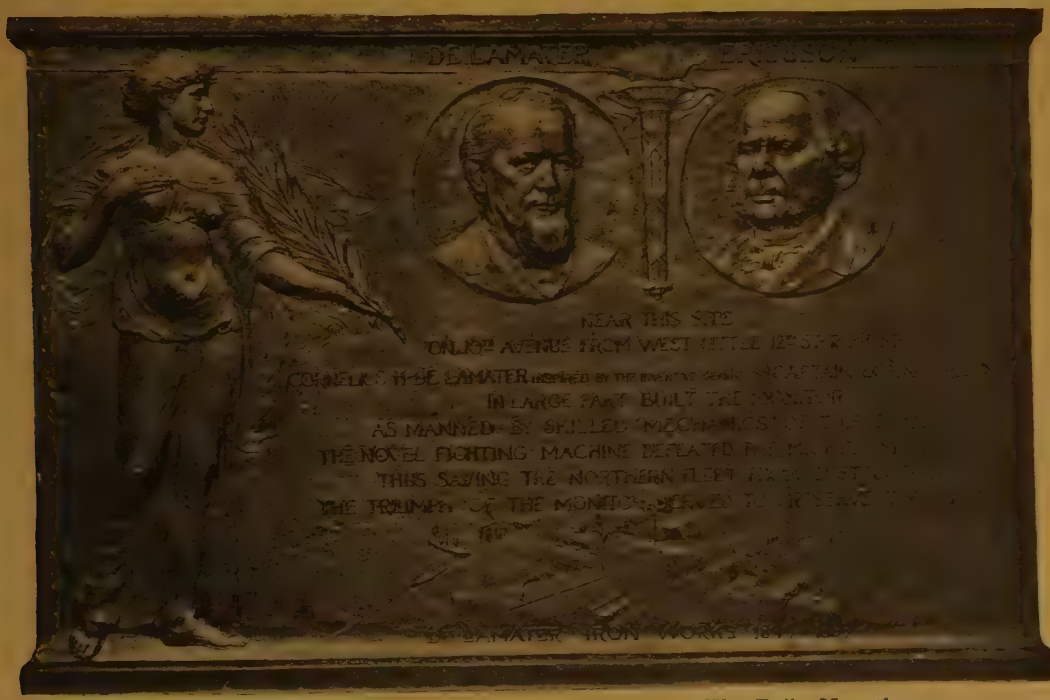
Born in Dover, Dutchess County, New York, in 1822, Timby died in Brooklyn so late as 1909. In his youth he invented a floating dry dock, and a device for raising sunken vessels. Other inventions credited to him are the American turbine wheel, the first portable barometer, and a process for printing terrestial globes in colors.

In 1841, when Timby was but nineteen, the idea of a revolving battery was suggested to him by the sight of Castle William, the round brick fort on Governor's Island, in New York harbor. He went to Washington, where he attempted to interest government officials in the idea of a circular iron structure to be operated as a revolving battery. He submitted an ivory model of his invention to Senator J. C. Calhoun. Bureaucratic circles were not interested in the young man's invention. He did not patent it, therefore; but in 1843 he filed an application; and that same year President Tyler examined a model of Timby's device on exhibition at the New York City Hall. Timby's application covered the principle of a revolving tower, placed on land or water, for offensive or defensive warfare. During the Civil War the idea became available in an unexpected manner.

In the spring of 1861, the United States forces abandoned the Gosport navy yard on the Elizabeth River in Virginia. They set fire to several warships that could not be moved. Among these was the "Merrimac," which later was raised by the Confederates, who reconstructed it as an ironclad ram, and named it the "Virginia." Roused by reports of what the Confederates were doing, the United States Navy Department moved to obtain armored steam craft. John Griswold and John Winslow, builders of Troy, New York, were chosen to construct an armored floating battery from plans to be furnished by John Ericsson.

In a letter to a Swedish friend, John Ericsson once wrote: "Allow me to remind you that I am an engineer and designer rather than an inventor." For the "Monitor," as Ericsson named it, Theodore Timby's idea of an armored revolving tower was used, and a royalty of $5,000 paid him. Similar royalties were paid to him for use of the turret principle in the "Pacific" and the "Dictator." Records show that Timby was finally granted a patent on his device in 1862, and for an improved battery tower.

The hull of the "Monitor" was built in the Continental Iron Works, Greenpoint, Long Island; all of its machinery at the DeLamater works, and the turret in a third plant, the Novelty Iron Works. The new craft was put into commission on February 25, 1862. The battle between the "Monitor" and the "Merrimac," which followed, was epochal in naval warfare: it was the first action between ironclads, and served to quiet the fears of the Government that it would not be able to maintain the blockade of Southern ports. Timby criticized Ericsson for placing the "Monitor's" pilot house on the forward deck in the way of her own guns, instead of above the turret, where he said it should have been.



Tablet Designed to Mark the Site Where the Monitor Was Built, Near the Hudson River, New York City

The engagement between the "Monitor" and the "Merrimac" was one of the most important and significant in the history of naval warfare, demonstrating as it did the value of armored vessels and large guns, while the destruction of Federal vessels by the "Merrimac" the day before showed the impotence of wooden ships against armorclads. Thereafter, to the people of the North, the "Monitor" type represented all that was efficient, powerful, and perfect in naval construction, and it was a long time before a just estimate of her defects as well as her good qualities was admitted except by naval officers.

The "Monitor's" career was short. After the battle with the "Merrimac," which, despite the fact that neither vessel was seriously injured and but a few men were wounded, was a complete victory for the Union ship, she took part in an unsuccessful attack upon Richmond in December, 1862. With her were the "Naugatuck," the "Port Royal," and the "Aroostook." While en route to Beaufort, South Carolina, she foundered in stormy weather off Cape Hatteras.

To-day such craft as the "Monitor" are obsolete; but Timby's turret idea is embodied, in modified form, aboard every battleship that floats. So, too, the firing of guns by electricity, for which he obtained a patent in 1862, is now in universal use. Beyond the $15,000 in royalties, already mentioned, Timby appears to have received no further compensation from any source. Vain attempts were made to obtain recognition from the Federal Government for him. In 1890 the legislature of New York unanimously passed a resolution asking Congress to grant such national recognition. In 1902 General B. F. Tracy wrote: "From my examination of the evidence produced by Dr. Timby, I am satisfied that he has a just claim for compensation from our Government." Some of the evidence was assembled in a pamphlet issued under the auspices of the Patriotic League of the Revolution. But Theodore Timby died a disappointed man—one more example, his friends say, of the ingratitude of republics. Ericsson outlived his popularity and came to be "but vaguely associated with a living presence," says his biographer, Church. Ericsson, however, was not so neglected as Timby; a statue of him was erected in New York, and when he died his body was sent to Sweden on the U. S. S. "Baltimore." Some day, say Timby's friends, a tardy measure of justice will be rendered Theodore Timby, the inventor of the armored revolving gun turret.

THE FIRST AMERICAN CIRCUS

THE pioneer elephant in America was imported on a venture by a sea captain. Her name was "Old Bet," and she arrived in New York about 1815. One John Sloat bought her, and then sold her again to Hachaliah Bailey. The new arrival was transported on a sloop as far as Ossining, on the Hudson, and driven from there back into the country, where she was exhibited in a barn.

From time to time, "Old Bet" was led out of her barn for a tour on the road, to give the country folk a treat. In those days an elephant was a fearsome and amazing thing. So as not to scare skittish horses, the huge beast was driven from place to place at night. There was another reason for night travel—her owner wished to keep the curious from getting a free glimpse of her. She was shown in barns or tavern sheds, and everywhere she went she lured the crowds. People came from surrounding counties; whenever a group gathered the talk was about Bailey's weird new jungle exhibit.

Built With First Circus Profits

Statue of "Old Bet," the signpost of the Elephant Hotel (upper) and the Elephant Hotel to-day; famous landmarks of Westchester County, New York

The showman's enterprise was so well rewarded that a number of his acquaintances began to foresee a profitable future in the menagerie business. In those days the village of Somers, in Westchester County, New York, was the resort of cattlemen, who came from Western States with droves of cattle and sheep, which were fattened for market in the surrounding pastures. New York, fifty miles away, drew from this source its chief supply of butchers' meat. Among the villagers on Somers Plain that profited from the cattlemen's trade were two brothers, Gerard and Thaddeus Crane. Like their townsman Hachaliah Bailey, they prospered and bought an elephant. A bill of sale dated 1825 shows that they purchased from Marcus Carmel "one equal and undivided third part of a female elephant" for $3,000. Forthwith, they took it on tour, going as far south as Mobile, Alabama. There they bought a lion, a lioness, and two cubs—the first lion cubs ever exhibited in the United States. Riders, acrobats, and clowns were added to "The Great London Circus," which later developed into a large and celebrated organization. Other Westchester County villagers went into the menagerie and circus business, and for many years the countryside near Brewster was used as winter quarters for old-time "rolling shows."

"Old Bet" died about 1821. Incidentally, Phineas Barnum's "Greatest Show on Earth" was not launched until forty years later. Bailey, having started the first American animal show and gained a modest fortune, opened the Elephant Hotel in Somers, in 1827, on a frequented highway. On the grassy triangle in front of the entrance he put up a granite monument surmounted by a wooden image of an elephant. The impressive red brick building still stands at the crossroads, while the effigy of "Old Bet" still rules the plain where she made circus history over a century ago.—*George S. Bryan.*

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THE MOST HORRIBLE STORY

CHEMISTRY has worked so many wonders that the wonder now is what it will do next. Will it eventually find a solution of the original principle of life? That has been the vision of dreamer scientists for centuries. The alchemists—before chemistry became a real science—were deeply engaged in the study of the origin of life. Philosophers worked in laboratories to find philters that would restore youth or stay the inroads of age. Some more daring than others even ventured to break into the very kernel of existence, and tried to reproduce life by chemical means.

Which brings us to the story of "Frankenstein"—one of the most thrilling tales of supernatural horror in all literature.

In the summer of 1816 the poet Shelley and his wife Mary visited Switzerland, and found themselves neighbors of Lord Byron at Lake Geneva, the latter busy in writing his poem "Childe Harold." It was a wet, rainy summer, and the little party had filled in time reading uncanny tales.

Mary Wollstonecraft Shelley

Wife of the poet Shelley. Her story, "Frankenstein," written to interest a group of literary people sojourning in Geneva, caused a tremendous sensation when published, and to-day is still "the most horrible story"

"Let us each write a ghost story," said Lord Byron, and the party agreed to do so. Byron began a tale, a fragment of which he printed at the end of his poem "Mazeppa." Shelley planned one that he did not write.

Mrs. Shelley dreamed a horrible dream, and the whole story of "Frankenstein" came to her as in a vision. It was a story of a pale, nerve-wracked student of unhallowed arts, delving deeply and feverishly into the mysteries of existence, determined to find the principle of life. As Mary Wollstonecraft tells the story, Frankenstein gave himself up to chemical and biological research until he found the secret.

Then, from dissecting rooms and slaughter houses, he gathered bits of human organism, and put them together—a loathsome composition of flesh, bones, nerves, and vital organs.

In order to work more readily, he made his creation a monster eight feet high. Then, infusing the thing with the vital principle that he had discovered, he gave it the spark of life, and saw it stir with an uneasy, lifting motion. Overcome with fright, he rushed away from his hideous handiwork.

He tried to be rid of it, but it pursued him. He fled to his room and sought sleep, in the hope that something would quench the existence of the awful composite corpse that he had chemicalized into life.

He was awakened, and, behold, the ghastly thing stood at his bedside, opening his curtains, and gazing at him with yellow, watery, and weirdly brooding, speculative eyes.

"My maker, oh, my maker! What have you for me?" the gruesome creature cried. Then came to Frankenstein a shuddering, sickening, overwhelming sense of human responsibility.

That is the story of Frankenstein. His creature became a demon destroyer that ever pursued him. It ravaged, tortured, and killed. He could not get rid of it. He had made it, and it—the horrible, haunting Thing—was his evil spirit.

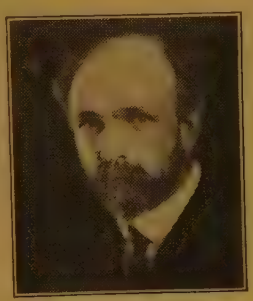
And so, whenever any unfortunate individual has created or assumed a monster responsibility that has pursued and persecuted him, that has driven him to distraction and made his life a burden, he is called a "Frankenstein."

The story of Frankenstein was published in 1818. It created a sensation in England and throughout the Continent, where it was translated into various languages. It ran through many editions, for several of which Mrs. Shelley wrote special introductions in which she described the circumstances under which the story came to be written. The book was republished in America, and copies can be picked up at old bookshops.—*W. D. M.*

Does your English help or hurt you?

Does your English reveal your lack of education or does it prove that you are a person of culture and refinement? Are you handicapped in your speech and writing or does your command of English rise to meet every occasion and every situation? English is the one weapon you must use every day. Here is how you can improve it almost at once.

MANY people say, "Did you hear from him to-day?" They should say, "Have you heard from him to-day?" Some people spell calendar "calender" or "calander." Still others say "between you and I," instead of "between you and me." It is astonishing how many people use "who" for "whom," and mispronounce the simplest words. Few people know whether to spell certain words with one or two "c's" or "m's" or "r's," or with "ie" or "ei," and when to use commas in order to make their meaning absolutely clear. And very few people use any but the most common words—colorless, flat, ordinary. Their speech and their letters are lifeless, monotonous, humdrum. Every time they talk or write they show themselves lacking in the essential points of English.



SHERWIN CODY

Every time you talk, every time you write, you show what you are. When you use the wrong word, when you mispronounce a word, when you punctuate incorrectly, when you use flat, ordinary words, you handicap yourself enormously. An unusual command of English enables you to present your ideas clearly, forcefully, convincingly. If your English is incorrect it hurts you more than you will ever know, for people are too polite to tell you about your mistakes.

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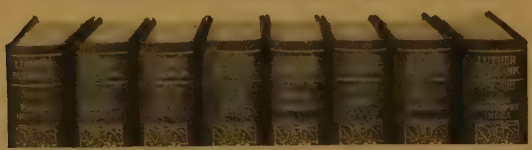

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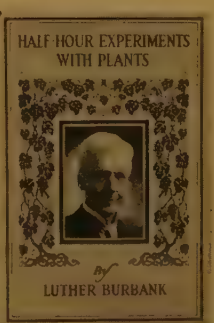

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Mr. Seton is universally beloved because he has the unusual gift of doing three things at once: he entertains, diverts, and instructs. And in addition he is a most engaging artist. His pen pictures run all through his books. These are as quaint and full-flavored with the outdoors, as are his word pictures. The newest book from Mr. Seton's magic pen is included in this set—WOODLAND TALES—this volume alone has 100 drawings by the author. TWO LITTLE SAVAGES has 300 drawings. The others all have half-tone engravings and pen-and-ink drawings of every outdoor subject from grizzly bears to Indian wigwams.

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The Open Letter

WHAT we *hear* counts not so much as what we *overhear*. What we hear may be said to us in kind consideration; it may be prompted by mere politeness, or perhaps deliberate policy. It is what we *overhear* that usually gives us the plain, unvarnished truth. Sometimes, of course, we overhear things said in malice, but, generally speaking, we get the facts about ourselves from the unguarded words of others. Approval, therefore, coming unconsciously in this way, has a value.

Which means that we set great store by something that we recently overheard. It was the statement of a man to his companion at a news-stand—we being nearby. He pointed to a copy of The Mentor and said: "There is a worth-while magazine. My wife and I have read it for years, and we get a lot out of it. Now that my boy and girl are reading things, we keep it up for their benefit as well as our own." It was good to hear.

★ ★ ★

Fully as much appreciated as "things overheard" are the many friendly letters that come voluntarily from our readers. It was when I was thinking about that boy and girl of the man at the news-stand, who were now "reading things," that I got the following letter from a high-school girl in Kentucky. The Mentor has always had in mind the high-school girl and boy. They are *beginning* to get the sort of knowledge that we older ones are still accumulating.

Our Kentucky high-school girl tells us that she writes "to express sincere admiration and appreciation of The Mentor."

To-day [she says] came a most satisfying issue—the February number. It so happened at school that I had a theme subject given to me—Robert Louis Stevenson. I have loved the story of "Tusitala"—have liked everything he wrote that I have read. High-school students often have to get hold of a lot of information at very short notice, so picture for yourself my joy at picking up The Mentor this afternoon with that interesting article about the literati of the South Seas! I felt as if a trusted friend had come to my aid—which was indeed the fact.

As in this case, I shall now have more "local color," so to speak, for my theme—so in others. Quite often I find myself possessed of information that lights up an otherwise prosaic recitation—all due to my Mentor. They all say, "Where did you learn that?" "Where did you get that?" You may be sure I boost The Mentor at every opportunity.

In fact, I couldn't do without it and feel "educated." We used your questionnaire as a regular lesson in history; my teacher had the number.

I think The Mentor truly a marvelous magazine, and absolutely invaluable. The good it does is really inestimable, and those who are in charge of it deserve the very highest commendation.

Cordially yours,
MARY ELIZABETH STEWART.

★ ★ ★

There is another and a matter-of-fact way of looking at things. Old Dr. Samuel Johnson, heavy, solemn, and slow as he was, had a practical outlook on life. When his friend Oliver Goldsmith was superintending the rehearsals of "She Stoops to Conquer," in 1773, Goldsmith remarked that the theater-cleaners dropped their dusters to listen, and the candle-snuffers said that no play in years had such wit. Dr. Johnson answered sagely: "Your true friend, sir, is the friend who pays for his seat to hear your play."

The best thing, therefore, about the letters we get is that they are from "friends who have paid for their seats." They—and thousands of others who take The Mentor—are the "true friends." There is nothing so satisfying as that material expression of friendly approval: the subscription blank, filled in—Yes, just one thing, and that is still more satisfying: the renewal. Our chief satisfaction lies in the fact that we have more than twice as many of Dr. Johnson's "friends who have paid for their seats" as we had last year. Our thanks to you that like The Mentor!

W. D. Moffat
EDITOR

Testing the Infinitesimal

From the slabs of optical glass to the finished product, each Kodak Anastigmat lens must successfully emerge through ten rigid tests, performed in ten *different* departments. Even in two final tests which are identical, the judgment of one set of inspectors is pitted against that of another.

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